

New LCA Theses

Environmental Life Cycle Costs in the Australian Food Packaging Supply Chain

PhD Thesis by Karli James

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The packaging industry is composed of inter-related, multi-disciplinary processes where raw materials from nature are converted and processed into materials that can be shaped and formed into a variety of shapes and sizes for the protection, containment and distribution of goods. Value is added to the product at each stage along the supply chain and environmental impacts occur at different degrees throughout. Key influences expected to dominate the use of packaging in Australia in the coming decade are consumer demands, technology changes, demographic and life-style changes, supply chain management and the environment.

As the amount of packaging materials and applications have increased over the years, pressure has emerged from governmental and societal stakeholders for companies in the packaging supply chain to increase the environmental accountability for their product(s). Companies will need to adopt a life cycle perspective into the decision-making framework, to support managements' decisions regarding the environmental impacts and costs of activities and products.

The aim of this thesis (James 2003) was to explore the environmental impacts and environmental costs recognition and management within companies in the Australian food packaging supply chain. A grounded theory approach was used to develop propositions from the findings that could be tested in further research. A qualitative case study approach was undertaken using face-to-face interviews with Environmental Managers of twenty-seven companies that operate within the Australian food packaging supply chain.

The findings from the research span a broad range of issues ranging from environmental issues, voluntary programs through to environmental accounting. The findings demonstrate that the current environmental issues in the Australian food packaging supply chain are legislation (in particular the National Packaging Covenant – NPC), and the management and minimisation of solid waste and emissions to air, land and water. The main drivers for companies to sign the NPC are to avoid the alternative (legislation – 73%) and to avoid the National Environment Protection Measure for Used Packaging Materials (35%) which is a regulatory safety net to catch 'free rider' companies. Under half of the companies (41%) in this study were signatories to the NPC at the time of the interviews. The main drivers for companies to sign the Greenhouse Challenge Program (GHCP) are to demonstrate public commitment and receive public recognition for reducing greenhouse gas emissions. Around 30% of the companies in the study were signatories to the GHCP at the time of the interviews. The regulatory National Pollutant Inventory (NPI) program was seen to have a minimal effect upon the organisations, being more a compliance issue and part of normal management and reporting.

Companies generally provide environmental information in the company annual report before implementing an environmental management system and/or a stand-alone environmental report. This supports in some way Elkington's (1997) suggestion that companies start reporting on environmental issues before they

have in place the internal systems to assist them in the supply of information. Only 37% of the companies had an environmental section included in their annual report and 33% had produced a stand-alone environmental report. The increase in the development of national and international reporting guidelines and the desire to disseminate information to stakeholders are the key drivers for the production of a stand-alone environmental report. Half of the companies (52%) had an environmental management system (EMS) in place, with eight of the fourteen EMS's (57%) implemented in 1997.

The observed level of adoption of LCA among the Australian food packaging supply chain is low (only six companies – 22%). The main reasons for undertaking the LCAs were to collect environmental information about products and processes, though the findings of the LCA are not integrated back within the company.

The use of environmental accounting techniques is limited and there is no consistent connection between actions taken on environmental issues and allocation of environmental costs. Even with increasing external pressures, such as the NPC, GHCP and NPI, there still exists a missing link between the actions of companies and the supporting costing information to aid in appropriate decision making. Conventional costing is most widely used. In terms of specific techniques, activity based costing is used more widely (52%) than value chain analysis (41%) and life cycle costing (22%), with public companies more inclined to use ABC than private companies.

The thesis concludes by synthesising the findings into a series of propositions. Three of the nine propositions are presented below:

- The existence of voluntary environmental agreements and regulatory measures do not motivate companies to identify environmental costs.
- Companies do not use environmental accounting information to assist in linking the activities they undertake to reduce environmental impact with the identification and calculation of environmental costs.
- Differing definitions of life cycle costs leads to companies using life cycle costing in a limited form and for internal costs only.

This research has laid the foundations for further research to investigate the reasons, among a wider sample population, of how companies view 'taking on and being accountable on a life cycle perspective' and how environmental accounting and mechanisms such as voluntary agreements allow this to be achieved.

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References: Elkington J (1997): 'Foreword' in: ISO 14001 and Beyond. Environmental management systems in the real world, ed. Sheldon C, Greenleaf Publishing Ltd. Sheffield, UK: 7–9

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